G-000-1105.10

1552

WASTE MINIMIZATION AND POLLUTION PREVENTION AWARENESS PLAN

04/30/91

26
REPORT

G-000-1105.10

CONTROL NO

NON-CONTROLLED COPY

PL-FMPC-3009
Supercedes
Internal Special
FMPC-2205
Dated May 1990

1552

WASTE MINIMIZATION AND POLLUTION PREVENTION AWARENESS PLAN

FEED MATERIALS PRODUCTION CENTER

Issue Date: 4/30/91

WESTINGHOUSE MATERIALS COMPANY of OHIO
P.O.BOX 398704
Cincinnati, Ohio 45239-8704

PL-FMPC-3009 1552
Supercedes
Internal Special
FMPC-2205
Dated May 1990

WASTE MINIMIZATION AND POLLUTION PREVENTION AWARENESS PLAN

Issue Date: 4/30/91

FEED MATERIAL PRODUCTION CENTER

WESTINGHOUSE MATERIALS COMPANY OF OHIO

P. O. Box 398704
Cincinnati, Ohio 45239-8704

TABLE OF CONTENTS

LIST OF FIGURES AND TABLES

TABLES

1.0 INTRODUCTION/BACKGROUND

1.1 Purpose of Plan

The purpose of this plan is to establish the FMPC Waste Minimization and Pollution Prevention Awareness Program. The plan specifies those activities and methods that will be employed to reduce the quantity and toxicity of wastes generated at the FMPC. In addition to establishing the FMPC Waste Minimization and Pollution Prevention Awareness Program, this plan also meets legal requirements, educates FMPC personnel, sets goals, and plans actions regarding waste minimization and pollution prevention.

1.1.1 Legal Requirements

This plan meets EPA requirements established under the Resource Conservation and Recovery Act (RCRA) regarding waste minimization and the Superfund Amendments and Reauthorization Act (SARA) Title III; Emergency Planning and Community Right-to-Know Act (EPCRA). RCRA requires that generators of hazardous waste "have a program in place to reduce the volume and toxicity of waste generated to the extent that is economically practicable." Section 313 of EPCRA states that techniques used to identify source reduction opportunities be submitted to the EPA for each toxic chemical that requires a Form R, the Toxic Release Inventory. This includes employee recommendations, external and internal audits, participative team management, and material balance audits.

The plan also satisfies requirements of DOE Orders 5400.1, 5400.3, and 5820.2A.

DOE Order 5400.1 defines general requirements for pollution prevention awareness and waste minimization programs at DOE facilities. The plan complies with the Order by:

1) establishing waste minimization and pollution prevention goals and objectives, and by identifying strategies and time tables for attaining them;

2) providing the overall framework for the design and implementation of the FMPC Waste Minimization and Pollution Prevention Awareness Program; and

3) assigning specific responsibilities for complying with the requirements of the Order.

DOE Order 5400.3 establishes DOE hazardous and radioactive mixed waste policies and requirements. The Order implements the requirements of RCRA within the framework of the environmental programs established under DOE Order 5400.1.

DOE Order 5820.2A establishes policies, guidelines, and minimum requirements by which DOE manages its radioactive waste. The Order states that the "generation, treatment, storage, transportation, and/or disposal of radioactive wastes, and the other pollutants or hazardous substances they contain, shall be accomplished in a manner that minimizes the generation of such wastes across program office functions and complies with all applicable federal, state, and local environmental, safety, and health laws and regulations and DOE requirements." The Order also requires the preparation of a Waste Management Plan for each site that generates, treats, stores, or disposes of radioactive, mixed, or hazardous waste.

DOE's "Waste Reduction Policy Statement" consolidates the requirements of DOE Orders 5400.1, 5400.3, and 5820.2A. The statement requires all DOE Program Offices and Field Operations to institute a waste reduction policy to reduce the total amount of waste that is generated and disposed of by DOE facilities through waste minimization (source reduction and recycling) and waste treatment.

1.1.2 Education

This plan has been written with the intended purpose of educating personnel on waste minimization principles, methods, and strategies.

Education of all personnel will assist the incorporation of waste minimization principles into the management's operating philosophy. Waste minimization will then be routinely integrated into site SOPs and design criteria, just as safety and quality principles are currently incorporated.

1.1.3 Set Goals and Plan Actions

The FMPC Waste Minimization and Pollution Prevention Awareness Program incorporates site specific goals and planned actions into the program. The goals that are set will be aggressive goals that emphasize implementation and execution.

Actions that are implemented are specific tasks whose completion achieves actual, measurable reductions in waste generation.

Refer to section 4.4 for a listing of site specific goals.

1.2 Scope of Plan

The waste minimization program applies to all present and future activities at the FMPC which generate any type of waste. The program is an organized, comprehensive, and continual effort to systematically reduce waste generation.

1.2.1 Benefits of Waste Minimization

Waste minimization contributes to the protection of human health and the environment by reducing risks to potentially exposed people and environmental impacts from releases of pollutants. In addition, an aggressive waste minimization program demonstrates the FMPC's commitment to environmental protection.

Other potential benefits from a sound waste minimization program include the following: 1) reduce or eliminate liabilities associated with the generation of wastes; 2) comply with regulations; 3) reduce waste management and compliance costs; 4) reduce resource usage; 5) reduce or eliminate inventories and releases of hazardous chemicals reportable under the Emergency Planning and Community Right-To-Know Act (EPCRA); and 6) improve public image.

1.2.2 Waste Minimization Definition and Methods

Waste Minimization is the reduction, avoidance, or elimination of waste generation. Methods of waste minimization include:

- source reduction
- recycle, reuse, reclaim
- treatment to reduce volume, toxicity, or mobility

The Environmental Protection Agency (EPA) has stated its regulatory intent and preference for reducing waste at the source over management of waste after it is generated. Source reduction is the major priority in the FMPC's waste minimization program, as this eliminates the problems associated with handling wastes.

Source reduction activities and techniques include material substitution, process optimization or modification, technology changes, and administrative changes including inventory control and housekeeping practices, such as waste segregation.

The second priority is to recycle, reuse, or reclaim those potential waste materials that cannot be eliminated or minimized.

Recycling allows potential waste materials, or materials destined for disposal, to be put to a beneficial use. Recycling techniques are characterized as use, reuse, and reclamation (resource recovery).

The third priority is to treat all waste that is generated to reduce the volume, toxicity, or mobility prior to storage or disposal.

Waste minimization at the FMPC will be accomplished by following the above mentioned hierarchy of environmental protection practices.

THREE MAJOR TECHNICAL ALTERNATIVES

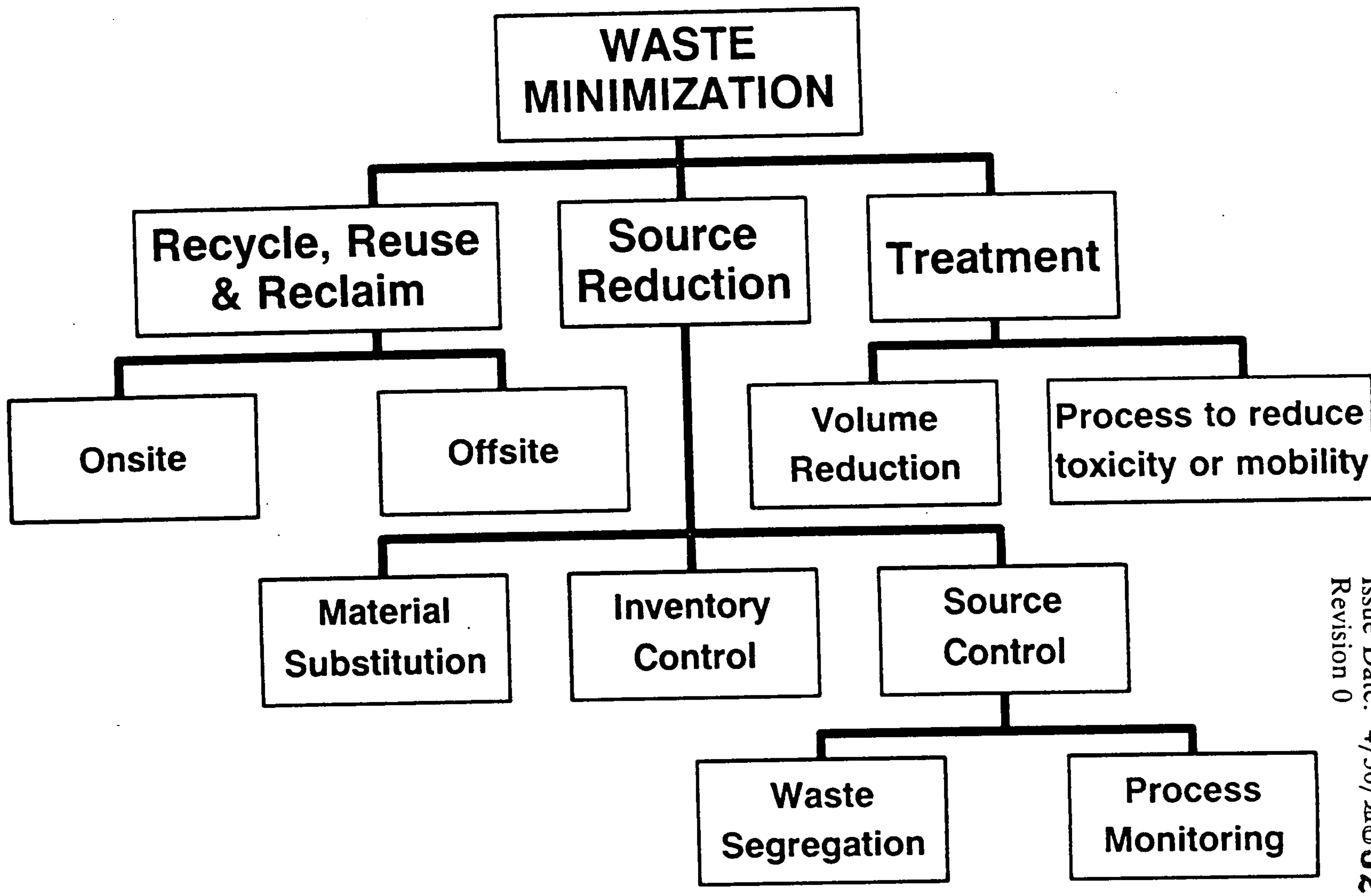


FIGURE 1
Three Major Technical Alternatives
Page 5 of 43

PL-FMPC-3009
Issue Date: 4/30/91
Revision 0

1552

1.3 FMPC Mission, Site Description, and Background Information 1552

1.3.1 Mission Statement

The FMPC is owned by the U. S. Government; Westinghouse Materials Company of Ohio is the prime contractor to the U. S. Department of Energy (DOE). The FMPC's mission is environmental restoration and waste management.

1.3.2 FMPC Site Description

The FMPC is located in southwestern Ohio near the unincorporated village of Fernald, Ohio (See Figure 2). Cincinnati, Ohio, is approximately 20 miles to the southeast, and Hamilton, Ohio, is approximately 10 miles to the northeast of the FMPC. The FMPC comprises 1,050 acres and is bounded by Ohio Route 126 to the north, a dairy farm to the east, Willey Road to the south, and Paddy's Run Road to the west (See Figure 3). The production area covers approximately 136 acres near the center of the FMPC.

The historic mission of the FMPC was the conversion of uranium-containing residues and uranium compounds to high purity uranium metal for use as feed in U. S. defense programs. Production processes generated solid waste that was grouped into four categories: low level waste (LLW), hazardous waste, mixed waste, and conventional industrial waste. In 1989, the FMPC mission changed to one primarily of environmental restoration and waste management.

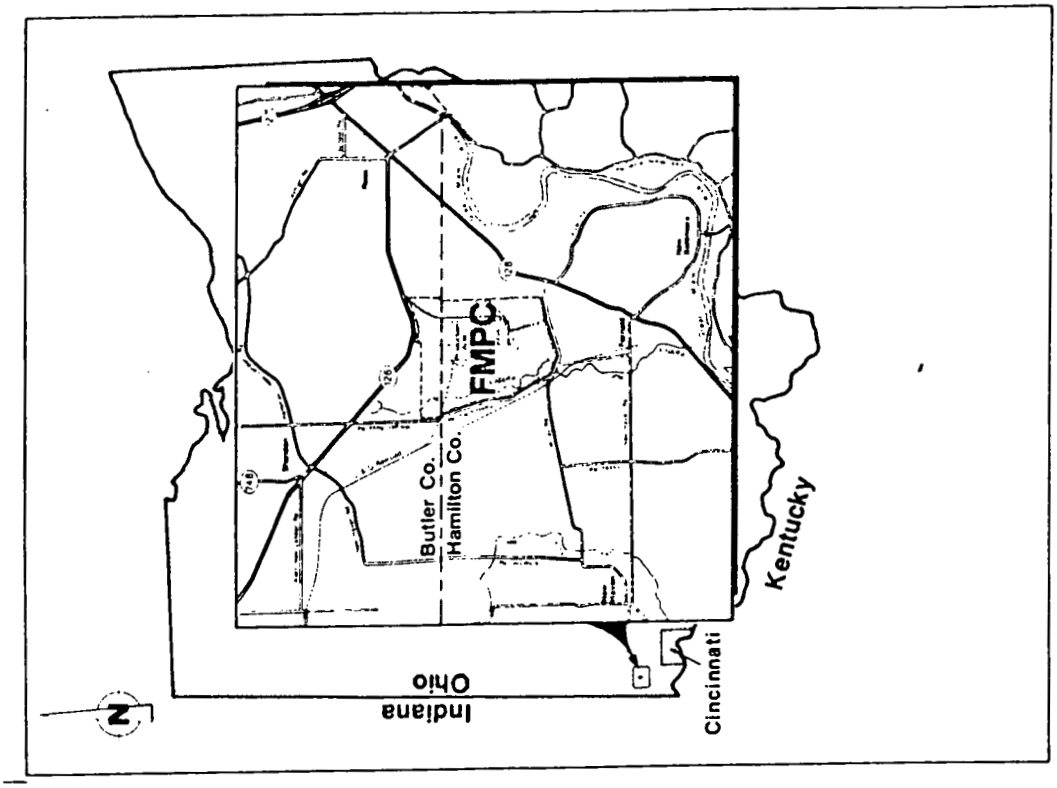


FIGURE 3
FMPC Site Map

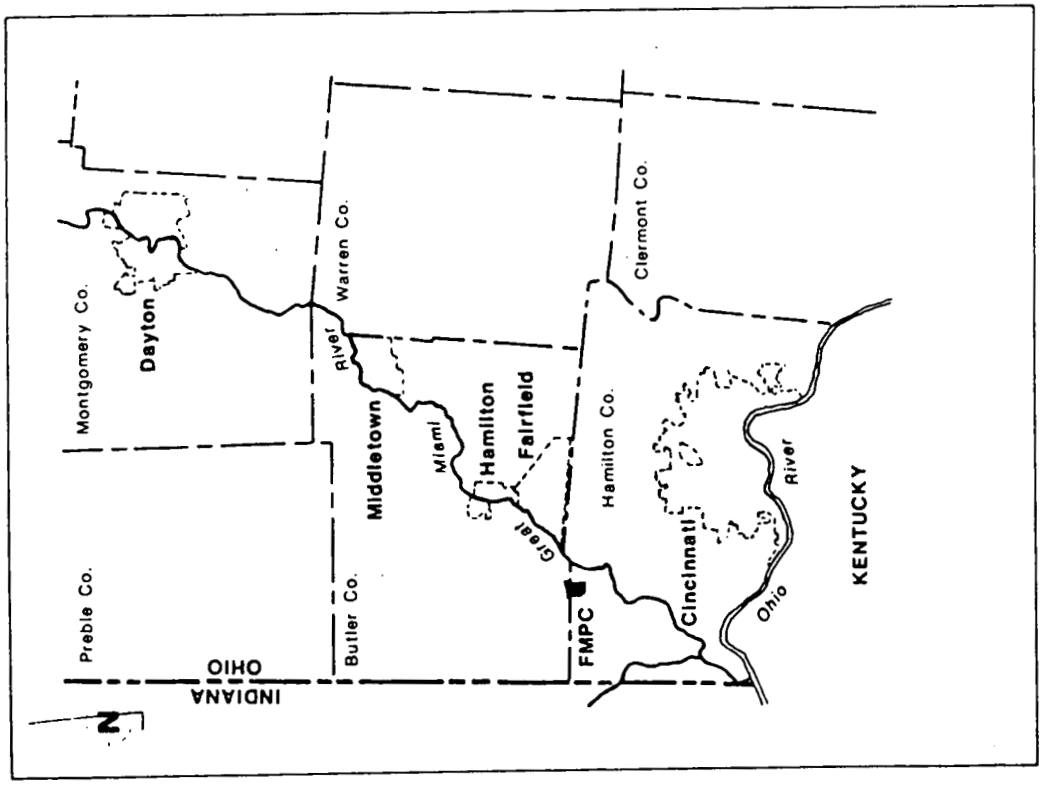


FIGURE 2
Tri-State Map

1.3.3 Major Waste Stream Categories at the FMPC

There are four major waste categories generated onsite at the FMPC:

- Sanitary Waste
- Low Level Waste (LLW)
- RCRA/Mixed Waste
- Toxic Substance Control Act (TSCA) Waste

Each of these categories is further broken down into specific waste streams that correspond to waste streams identified in the FMPC 30-Year Roadmap.

1) Sanitary Waste

   - Noncontaminated Trash
   - Noncontaminated Rubble/Soil
   - Water Treatment Lime Sludge
   - Flyash

2) Low Level Waste (LLW)

   - Dry Compactible Waste
   - Compactible Refuse Metal/Scrap Drums
   - Noncompactible Refuse Metal
   - Scrap Recoverable Metal
   - Contaminated Rubble Soil
   - Contaminated Asbestos
   - Dry Noncompactible Waste
   - Wet and Dry Drummed Residues

3) RCRA/Mixed Waste

4) TSCA Waste

- Contaminated PCB Sludges/Liquids

Refer to Table 1 for a description of each waste stream. Each waste stream's generation rate and predicted generation rate will be discussed in section 6.1.1.

WASTE STREAM IDENTIFICATION
TABLE 1

Waste Stream	Description
Sanitary Waste	
Noncontaminated Trash	Paper and office trash generated from the uncontrolled areas such as administrative waste.
Noncontaminated Rubble/Soil	Rubble/soil generated by construction with <35 pCi/g contamination
Water Treatment Lime Sludge	Lime sludge generated from waste treatment operations, stored in 2 lime sludge ponds.
Flyash	Generated from the burning of coal in the Boiler Plant.
LLW	
Dry Compactible Waste	Compactible paper collected from the controlled area. Includes office trash, cardboard, clothing, packaging materials, floor sweepings, plastic, etc.
Compactible Refuse Metal/ Scrap Drums	Refuse metal that can be compacted or volume reduced. Includes empty drums, old lockers, metal cabinets, desks, and chairs.
Noncompactible Refuse Metal	Refuse metal that cannot be compacted and is packaged for disposal.
Scrap/Recoverable Metal	Decontaminated metal, equipment, and vehicles from onsite activities such as construction and maintenance.
Contaminated Rubble/Soil	Category 2; generated by construction with >35 pCi/g <100 pCi/g contamination. Category 3; generated by construction with >100 pCi/g contamination. Packaged for offsite shipment.
Contaminated Asbestos	All asbestos generated onsite from construction and maintenance activities.
Dry, Noncompactible Waste	Includes wood pallets, scrap filters, rubber, plastic, scrap wood, excess equipment, machinery, tools, and soil/rubble from nonconstruction activities onsite.
Wet & Dry Drummed Residues	Drummed floor sweepings, dust collector residues, sump sludges, filter cakes, and safe-shutdown residues.
RCRA/Mixed Waste	All RCRA/mixed waste that is generated from onsite activities.
TSCA Waste	
Contaminated PCB Sludges/ Liquids	All contaminated PCB sludges/liquids, ballasts, capacitors, transformers, and PCB contaminated trash and rags.

2.0 POLICY

2.1 Statement of Management Support/Commitment

The FMPC is totally committed to minimizing the generation of waste by giving preference to source reduction, material substitution, and environmentally sound recycling over treatment, control, and disposal of such wastes. Top level management have taken appropriate action to provide adequate personnel, budget, training, and material on a continuing basis to ensure that the objectives of the Waste Minimization and Pollution Prevention Awareness Program are met.

2.2 Policy Statement

The Waste Minimization and Pollution Prevention Awareness Program is supported by FMPC management which is made evident by the following Waste Minimization Policy statement declarations:

- The FMPC shall employ the most cost effective and environmentally acceptable methods to manage and minimize the generation of waste.

- The FMPC's commitment to Waste Minimization and Pollution Prevention Awareness Program activities is demonstrated by conducting waste management activities to accomplish site cleanup and waste minimization through source reduction, recycling of materials, substitution of less hazardous materials, process optimization or modification, technology changes, and waste segregation.

3.0 RESOURCES

3.1 Program Budget

The following chart itemizes the funds allocated for the Waste Minimization and Pollution Prevention Awareness Program.

Activity	Funding in $K per year					
	FY-92	FY-93	FY-94	FY-95	FY-96	Total
Waste Minimization Planning	67	48	48	48	48	240
Waste Minimization Implementation	69	72	72	72	72	357
Total	236	120	120	120	120	597

3.2 Personnel

The planning and implementation of the Waste Minimization and Pollution Prevention Awareness Program requires one full-time employee to coordinate and report on waste minimization program status.

4.0 STRATEGY, OBJECTIVES, ACCOMPLISHMENTS, AND GOALS

4.1 Strategy

The Waste Minimization and Pollution Prevention Awareness Program strategy is to develop a systematic approach that all site organizations can use to minimize waste generation. Accurate and current information on waste generation and waste management costs provides the basis for implementation of specific waste minimization techniques and technologies. The essential elements of the FMPC strategy include the following:

- Identify and characterize all wastes generated onsite.
- Prioritize waste streams for waste minimization actions.
- Select target waste streams and methods to eliminate or reduce waste generation.
- List waste minimization options and evaluate options on a technical and economic basis.
- Implement waste minimization actions.
- Document and evaluate waste minimization progress.

4.2 Program Objectives

The objectives of the Waste Minimization and Pollution Prevention Awareness Program are to:

- Foster a philosophy to conserve resources and create a minimum of waste and pollution in achieving site strategic objectives.
- Promote the use of nonhazardous materials in plant operations to minimize the potential risks to human health and the environment.

- Reduce or eliminate the generation of waste materials through materials substitution, improved housekeeping, process optimization, technology changes, and inventory control to achieve minimal adverse effects on the air, water, and land.
- Enhance communication of waste minimization objectives, goals, and ideas laterally and vertically among site organizations.
- Promote integration and coordination of waste generators and waste managers on waste minimization matters.
- Characterize waste streams and develop a baseline of waste generation data.
- Identify and implement methods and technologies for waste minimization.
- Target policies, procedures, or practices that may be barriers to waste minimization.
- Create incentives for pollution prevention.
- Collect and exchange waste minimization information through technology transfer, outreach, and educational networks.
- Enhance employee awareness of pollution prevention goals, objectives, and methods.
- Develop specific goals and schedules for waste minimization activities.
- Comply with federal and state regulations and DOE requirements for waste minimization.
- List waste minimization options and evaluate options technically and economically.
- Implement waste minimization actions.
- Document and evaluate waste minimization progress.

4.3 Accomplishments

The following is a list of waste minimization actions that have been implemented at the FMPC.

4.3.1 Source Elimination

4.3.1.1 Eliminated the use of lead-based paints and substituted with leadfree equivalents.

4.3.1.2 Initiated a chemical product inventory reduction program in the Maintenance Department. Identified 130 chemical products, thus far, that can be eliminated due to infrequent use or product duplication.

4.3.1.3 Eliminated the use of 1,1,1-trichloroethane throughout the site, with the exception of the paint shop.

4.3.2 Recycling/Reuse

4.3.2.1 Formed the FMPC Total Quality Recycling Team to develop, implement, and oversee sitewide recycling programs.

4.3.2.2 Implemented a paper recycling program for administrative paper waste. Currently, 30 tons of paper a year are projected to be collected.

4.3.2.3 Initiated an aluminum can recycling effort, with annual collection projected at 1.5 tons. Some cans were donated to a program to aid area burn victims, with the bulk of the cans going to the Crosby School Ecology Club.

4.3.2.4 Began the reuse of Xylene in the Analytical Laboratory. The lab formerly generated approximately 3 liters of Xylene waste a month; and all of this is now recycled.

4.3.3 Segregation/Decontamination

4.3.3.1 Segregated approximately 13,500 cu. yds. of rubble/soil and office waste during 1990. The rubble/soil was classified as Category 1 and stockpiled in the K-65 storage area. The office waste was sent to a sanitary landfill.

4.3.3.2 Decontaminated, for unrestricted release, more than 485 tons of scrap steel.

4.3.4 Volume Reduction

4.3.4.1 Compacted 4,850 cu. yds. of noncontaminated trash to a volume of 1,070 cu. yds.

4.3.4.2 Compacted 2,300 cu. yds. of contaminated dry, compactible waste to a volume of 770 cu. yds.

4.3.4.3 Compacted 65,000 cu. ft. of compactible, refuse metal/scrap drums to a volume of 22,000 cu. ft.

4.3.5 Organizational

4.3.5.1 Conducted a baseline waste inventory that identified all LLW and RCRA waste streams onsite. Defined the current generation rate of each of the waste streams identified by type, source, and quantity. This will be used to evaluate the FMPC waste output and determine the best methods to minimize it.

4.3.5.2 Predicted generation rates for each waste stream identified in the baseline report for FY 1991 through 1994.

4.3.5.3 Formed a Waste Minimization Team to prioritize and perform assessments of waste streams targeted as possible candidates for waste minimization actions.

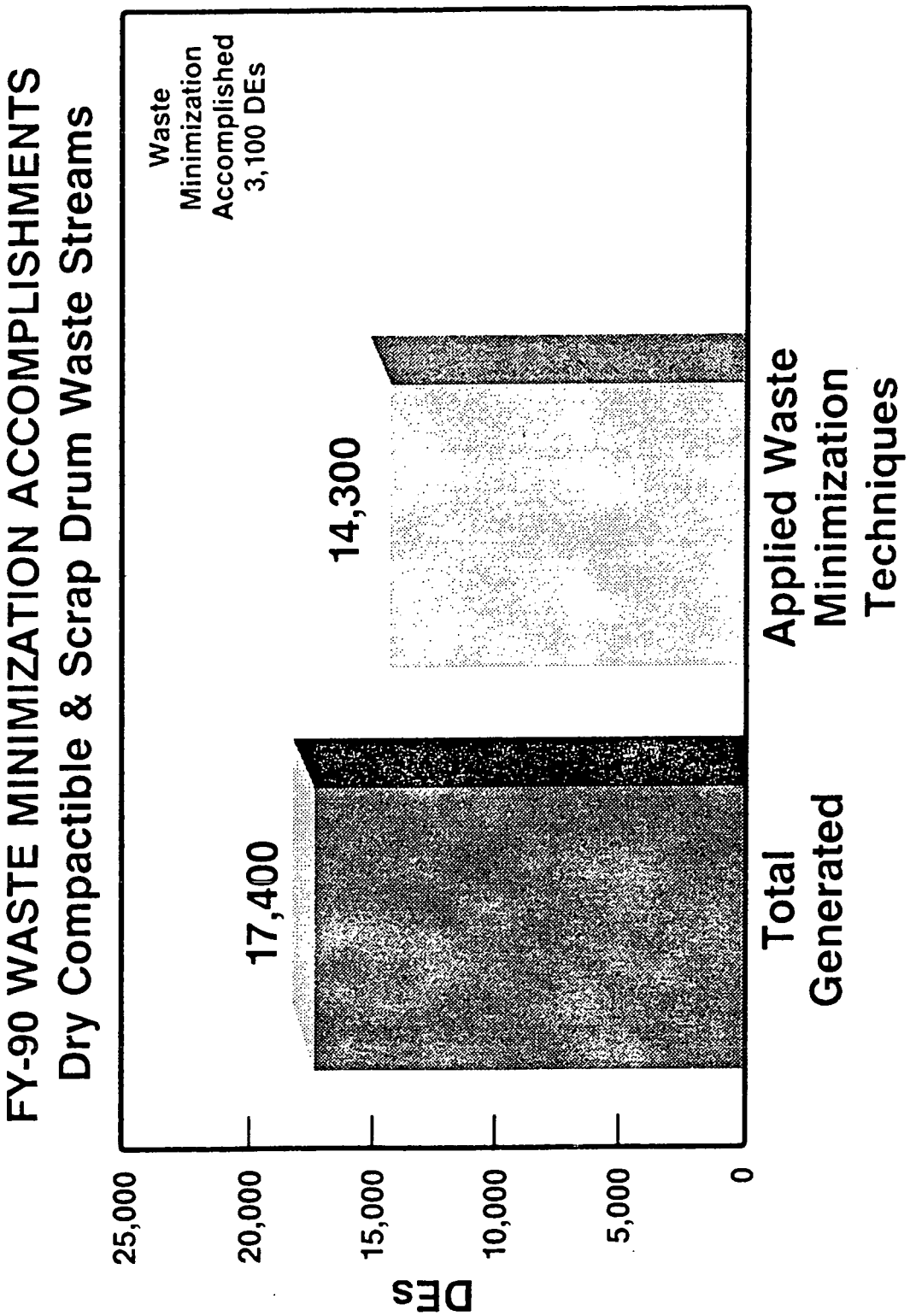


FIGURE 4
FY-90 Waste Minimization Accomplishments

4.4 Goals

The following is a list of site specific goals for the FMPC.

4.4.1 Source Elimination

4.4.1.1 Conduct sampling and analysis on the benzene contaminated oils generated from the garage to classify as LLW. This is estimated to eliminate 128 DEs of stored mixed oils in the RCRA warehouses, as well as the 2-3 DEs a month generated in the garage.

4.4.1.2 Review all chemicals used onsite and eliminate all infrequently used or duplicated products by December 1991. Purchase only chemical products that have been assessed to be indispensable.

4.4.1.3 Substitute cloth "anti-Cs" for all paper "anti-Cs" (except for asbestos work) by September 1991. This will reduce the contaminated compactible waste stream by approximately 500 cubic feet per year.

4.4.2 Recycling/Reuse

4.4.2.1 Maintain the office paper, computer paper, and aluminum can recycling effort. The FMPC Total Quality Recycling Team will continue to implement and assess these recycling programs, as well as educate personnel on the benefits of recycling.

The office paper recycling program was initiated in February 1991. This program is expected to collect 30 tons a year of recyclable paper.

The computer paper recycling program has been in operation since 1977. In 1990, 7.42 net tons of computer paper were collected. The anticipated collection rate is eight tons per year.

The aluminum can recycling effort benefits the Crosby Elementary School Ecology Club and has been operating since 1991. It is estimated that 1.5 tons per year will be collected for recycling.

4.4.2.2 Initiate a LaserJet cartridge recycling campaign in 1991. Approximately 500 cartridges are used per year at the FMPC. A recycling effort will save up to 40-50 percent on the cost of cartridges; this equates to a savings of approximately $16,000 - $20,000 a year.

4.4.2.3 Begin the operation of a distillation unit by January 1992 to recover spent solvents from the paint shop. The operation of this unit will produce a 90 percent recovery rate for the solvents run through the system. This will reduce the amount of solvents placed into RCRA storage warehouses from 6 DEs a year to 0.6 DEs a year.

4.4.2.4 Initiate the recycling of trichlorotrifluoroethane (Freon) in the Analytical Laboratory by May 1991. Approximately five liters per month of Freon is being generated by the lab during grease and oil determinations of NPDES samples. Recycling will be accomplished by the use of a distillation unit that will collect the vapors emitted and condense them back to reusable Freon. A 100 percent recovery is anticipated.

4.4.2.5 Start operation of the new Drum Reconditioning Facility in Plant 8 by September 1991. Approximately 18,000 empty drums will be generated per year from the Rotary Kiln and Rotex operations. Approximately 50 percent of these drums will be reconditioned and stored onsite or transferred to other DOE sites for reuse.

4.4.3 Segregation/Decontamination

4.4.3.1 Update the laundry system by September 1991. Several driers will be designated for clean clothing and one dryer designated for contaminated clothing, which will be equipped with a HEPA filter. This new system will provide segregation of radioactive clothing from nonradioactive clothing.

4.4.3.2 Initiate a demonstration project for the process area compactible waste by FY-92. This will be a demonstration project in Building 12 to segregate waste from nonradiological areas, within the process area, to determine whether waste can be released to a sanitary landfill. It is anticipated that 75 - 80 percent of the compactible waste from Building 12 will be considered nonradiologically controlled. This equates to approximately 1,150 DEs per year that could be released as clean.

4.4.3.3 Decontaminate 5,000 DEs (575 tons) a year of scrap metal from the scrap metal piles and sell to an offsite vendor for reuse. This will reduce the risk of contamination to the environment.

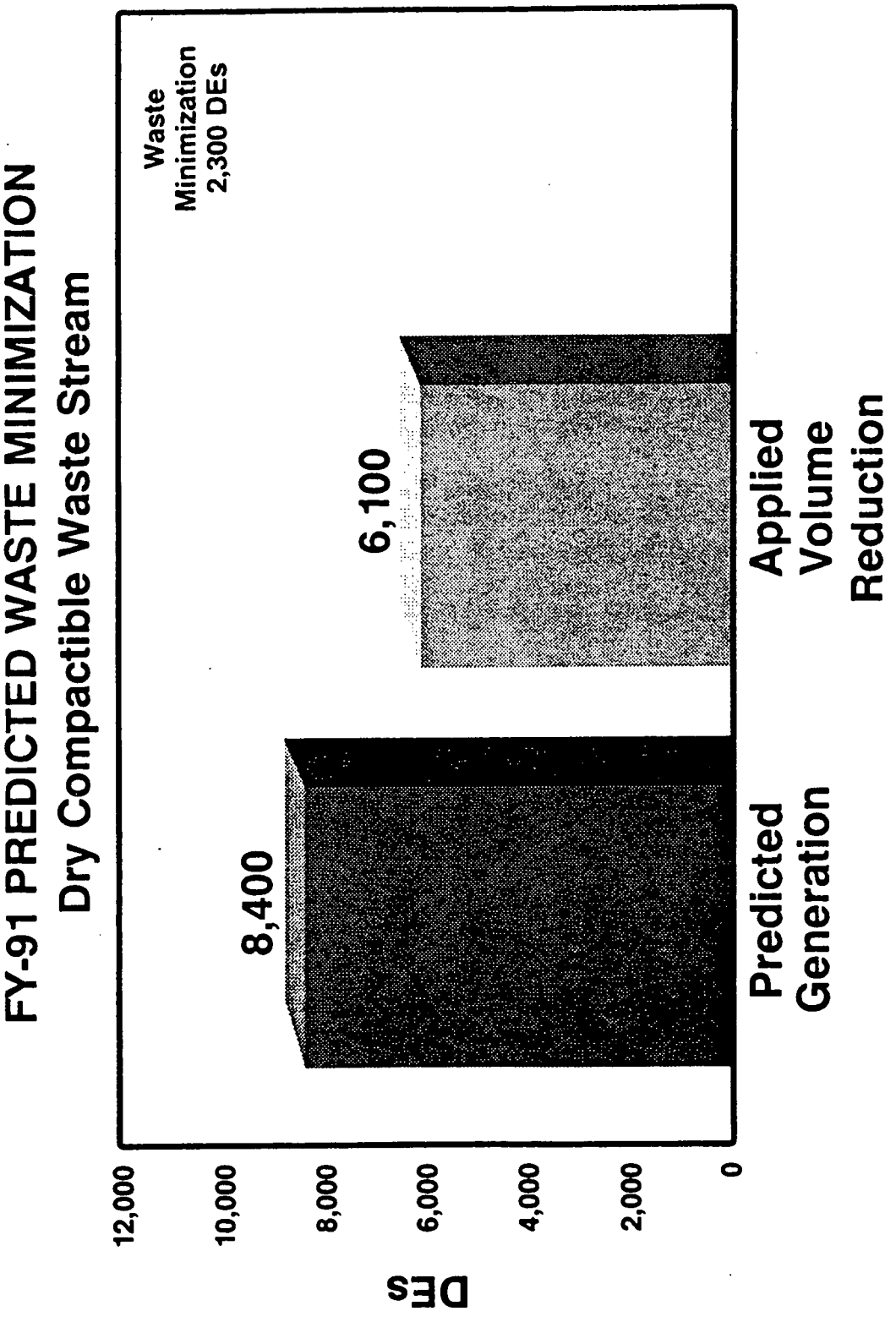


FIGURE 5
FY-91 Predicted Waste Minimization

4.4.4 Volume Reduction

4.4.4.1 Implement a super compaction system in Plant 8 by September 1991. This will volume reduce the compactible waste streams from a 3:1 compaction ratio to a 7:1 compaction ratio. This will produce a reduction in volume of approximately 1,100 DEs, which equates to a savings of approximately $171,000 for an 8 month period of operation.

4.4.4.2 Implement the Plant 8 Rotex repackaging station by July 1991. This will volume reduce the drummed residue waste stream by 20 percent, and will produce a reduction in volume of approximately 1,500 DEs. This equates to a savings of approximately $240,000 for a 10 month period of operation.

4.4.4.3 Implement the new Plant 8 rotary kiln by September 1991. This will volume reduce the wet, nonrecoverable residue waste stream by 30 percent and will produce a reduction in volume of approximately 2,400 DEs. This equates to a savings of approximately $384,000 for an 8 month period of operation.

4.4.4.4 Evaluate the feasibility of a Trash and Scrap Monitoring Facility. This facility would volume reduce the contaminated dry compactible and noncontaminated trash waste streams through shredding and compaction.

The TSMF would collect and monitor all dry compactible waste from the controlled, as well as the uncontrolled areas. The waste would be monitored numerous times to assure the cleanliness of the material. It would then be sent offsite to a local landfill. If it is monitored to be contaminated, it would be shipped to the Nevada Test Site (NTS). This facility would also provide an additional benefit through the ability to segregate specific recyclable wastes.

4.4.4.5 Initiate a demonstration project by FY-92 for solids precipitation at Plant 8 by exchanging lime with True Clear. The estimated volume reduction of the packaged wet residue waste stream is from 15 - 2 DEs per week.

4.4.5 Organizational

4.4.5.1 Integrate waste minimization and pollution prevention awareness concepts into an existing related training course. The training program will include waste minimization concepts that should be incorporated into every job aspect, so that it is routinely integrated into each phase of an operating procedure or design consideration.

4.4.5.2 Develop and conduct a class on waste minimization for the DOE/Westinghouse School for Environmental Excellence.

4.4.5.3 Inform FMPC employees of current and ongoing waste minimization accomplishments by use of pictorial essays, site bulletin boards, and site communication media (i.e., Focus, Communicator, FMPC Update). This will be done on a monthly basis.

4.4.5.4 Implement pollution prevention/waste minimization slogan contests to heighten awareness of these issues.

4.4.5.5 Renew the waste minimization suggestion boxes and award employees whose waste minimization suggestions are efficient and cost effective.

4.4.5.6 Perform ongoing waste assessments of targeted waste streams to analyze waste minimization actions that have been implemented.

5.0 ORGANIZATION AND STAFF RESPONSIBILITIES

5.1 Site Manager

The site manager is responsible for the facility's commitment to achieving a successful waste minimization program. The manager approves plans, policies, goals, and milestones and is responsible for ensuring that all employees are trained in waste minimization and pollution prevention awareness.

5.2 Waste Minimization Coordinator

The Waste Minimization Coordinator serves as chairperson of the Waste Minimization Team. The Waste Minimization Coordinator writes and updates the facility-specific waste minimization plan on an annual basis.

5.3 Waste Minimization Team

The responsibilities of the Waste Minimization Team include:

- Defining the objectives of the waste minimization program in accordance with this plan.
- Communicating program objectives to the site.
- Obtaining waste generator support and input for the program.
- Facilitating integration and coordinated interaction between waste generators and waste managers on waste minimization matters.
- Establishing waste minimization goals and objectives.
- Sponsoring ongoing employee awareness and training.
- Establishing a waste tracking system.
- Prioritizing waste streams for assessment.
- Selecting teams to conduct process waste assessments.
- Evaluating the technical and economic feasibility of options to reduce waste generation.
- Recommending and ranking options for implementation.

- Monitoring performance of waste minimization options that have been implemented and evaluating performance according to success criteria.
- Monitoring and reporting progress of the waste minimization program.
- Recommending personnel for achievement and incentive awards.
- Facilitating technology transfer and pollution prevention awareness.

5.4 Department Waste Coordinator

Each department participates in the waste minimization program through an assigned Waste Coordinator for their respective organization. The Department Waste Coordinator serves as the primary contact for all waste minimization activities and departmental reporting. Department Waste Coordinators serve on the Waste Minimization Team.

5.5 Employee

Employees are responsible for following approved waste minimization techniques and procedures to evaluate the potential for waste minimization in their work.

FMPC
WASTE MINIMIZATION & POLLUTION PREVENTION AWARENESS
LINE OF COMMUNICATION

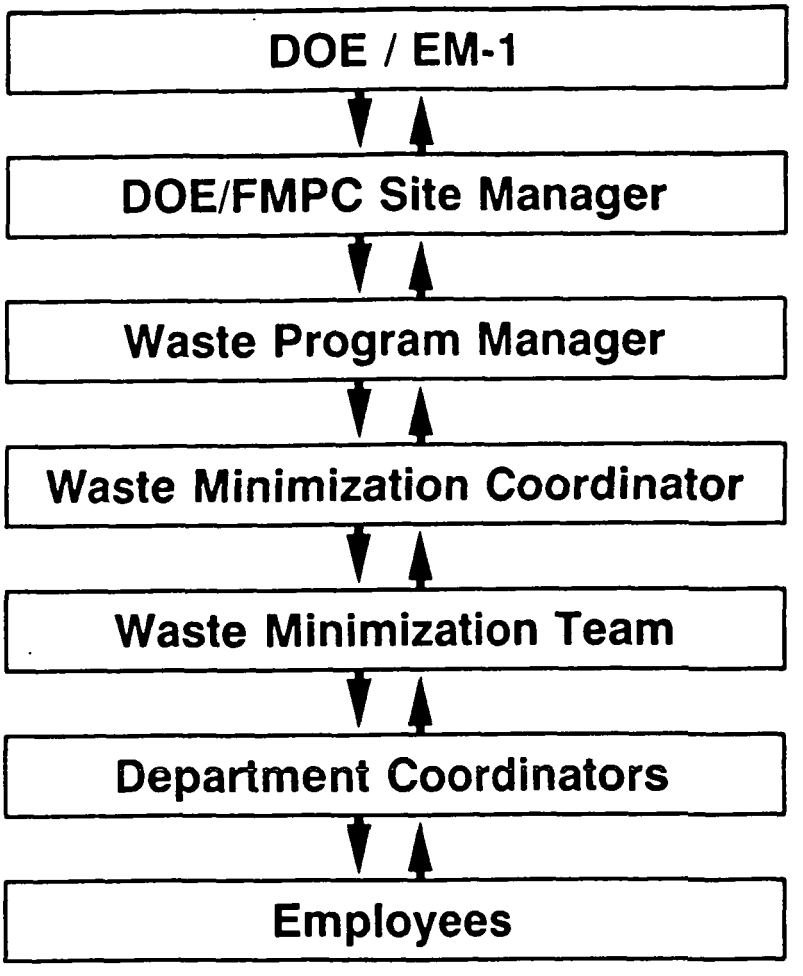


FIGURE 6
Waste Minimization & Pollution Prevention Line of Communication

1552

6.0 DESCRIPTION OF WASTE MINIMIZATION PLAN

6.1 Waste Assessments/Audits

Waste assessments are conducted as part of an ongoing program to identify, screen, and analyze options to reduce the generation of waste.

6.1.1 Identify Waste Stream and Collect Baseline Information

The first task during a waste assessment is to identify and characterize all waste streams onsite. Current generation rates were defined by type, source, and quantity in a Baseline Inventory Report in December 1990. In February 1991, the Waste Generation Prediction Report predicted waste generation trends for current waste streams at the FMPC. Predictions were made for FY-91, 92, 93, 94. The data from these reports becomes an inventory record and will become part of a site waste data base. The information will be used to prioritize the waste streams and target specific waste streams for waste minimization actions.

Refer to the following tables and figures for Waste Stream Baseline information.

- Table 2 - FMPC Waste Stream Generation Rates and Predictions
- Figure 7 - Dry Contaminated Compactible Waste Sources
- Figure 8 - Composition of Dry, Contaminated Compactible Waste
- Figure 9 - RCRA Generation 1990

G = Generated
SH = Shipped
ST = Stored

WASTE STREAM GENERATION PREDICTIONS (Table 2)

(All figures in DEs: 1 DE = 7.4 cubic feet)
NOTE: All compactible waste streams, amounts generated, are reported as uncompacted; amounts shipped as compacted.

WASTE STREAMS	FY-90	FY-91	FY-92	FY-93	FY-94	COMMENTS
Sanitary Waste						
Non-contaminated Trash	17,700 G 3,900 SH	17,700 G 3,900 SH	17,700 G 3,900 SH	17,700 G 3,900 SH	17,700 G 3,900 SH	Offsite Rumpke compactor; 4.5:1 compaction ratio.
Non-contaminated Rubble/Soil (Cat. 1)	49,000 G	—	—	—	—	Stored at K-65 storage area; < 35 pCi/g, generated by construction
Water Treatment Lime Sludge	1,800 G 55,000 ST	1,800 G 56,800 ST	1,800 G 58,600 ST	1,800 G 60,400 ST	1,800 G 62,200 ST	Stored in two lime sludge ponds west of the west water tower
Flyash	22,000 G 600,000 ST	22,000 G 622,000 ST	22,000 G 644,000 ST	22,000 G 666,000 ST	22,000 G 688,000 ST	Stored south of the west Stormwater Retention Basin (SWRB)
TOTALS	90,500	41,500	41,500	41,500	41,500	
Low-Level Waste						
Dry Compactible Waste	8,400 G 2,200 SH	8,400 G	* 8,400 G	* 8,400 G	* 8,400 G	FY-90, 91 Plant 2/3 trash baler; 3:1 compaction ratio. FY-92,93,94 Plant 8 super compaction system; 7:1 compaction ratio assumed
Compactible Refuse Metal/ Scrap Drums	9,000 G 2,900 SH	17,100 G	*33,000 G	*33,000 G	*33,000 G	FY-91 Plant 1 drum baler; 3:1 compaction ratio FY-92,93,94 Plant 8 super compaction system
Non-compactible Refuse Metal	15,000 G 9,500 SH	1,800 G	250 G	250 G	250 G	Refuse metal from Bldg. 69 and construction generated metals. Packaged for offsite disposal.
Scrap/Recoverable Metal	4,200 G	1,750 G	250 G	250 G	250 G	Decontaminated scrap metals, vehicles and equipment from construction, and maintenance.
Contaminated Rubble/Soil Category 2	25,100 G	—	—	—	—	Stored north of Plant 1, stockpile area; 35 pCi/g < 100 pCi/g; generated by construction
Category 3	14,600 G 8,100 SH	6,000 G	4,000 G	No projections made	No projections made	Boxed for offsite disposal; > 100 pCi/g; generated by construction
Contaminated Asbestos	1,800 G 3,700 ST	2,400 G 6,100 ST	500 G 6,600 ST	250 G 6,850 ST	250 G 7,100 ST	FY-90,91,92 include asbestos generated by construction projects. FY-93,94 No projections made for construction projects. Asbestos stored onsite pending approval by NTS of a Class I Landfill Permit.
Dry Non-compactible Waste	3,600 G 3,300 SH	11,000 G	4,000 G	4,000 G	4,000 G	Wood pallets, scrap filters, rubber, plastic, scrap wood, soils, maintenance activities, excess machinery, equipment and tooling. Packaged for offsite disposal
Wet & Dry Residues	1,500 G 410 SH	3,500 G	2,000 G	3,500 G	2,000 G	Dust collector residues, sludges, filter cakes, floor sweepings, safe-shutdown residues.
TOTALS	83,280	51,950	52,400	49,650	48,150	

G = Generated
SH = Shipped
ST = Stored

WASTE STREAM GENERATION PREDICTIONS (Table 2)

(All figures in DEs: 1 DE = 7.4 cubic feet)
NOTE: All compactible waste streams, amounts generated, are reported as uncompacted; amounts shipped as compacted.

WASTE STREAMS	FY-90	FY-91	FY-92	FY-93	FY-94	COMMENTS
RCRA Waste						
RCRA/Mixed Waste	387 G** 8,300 ST	406 G 8,706 ST	406 G 9,112 ST	406 G 9,518 St	406 G 9,924 ST	FY-91,92,93,94 RCRA generation increase of 5% due to anticipated increase in determinations. Stored onsite.
TSCA Waste						
Contaminated PCB Sludges/Liquids	19 G 42 ST	5 G 47 ST	0 47 ST	0 47 ST	0 47 ST	FY-92,93,94 No PCB generation is anticipated. CWIDs not yet generated for construction projects. Stored in onsite PCB warehouses.
RCRA Closures	0	400 G	130 G	No projection	No projection	Liquids from decontamination, contaminated clothing, equipment, etc. Packaged for offsite disposal.

* All dry compactible waste and compactible refuse metal/scrap drums will be compacted in super compaction system. Packaged for offsite disposal
** CY-90

TABLE 2
Waste Stream Generation Predictions

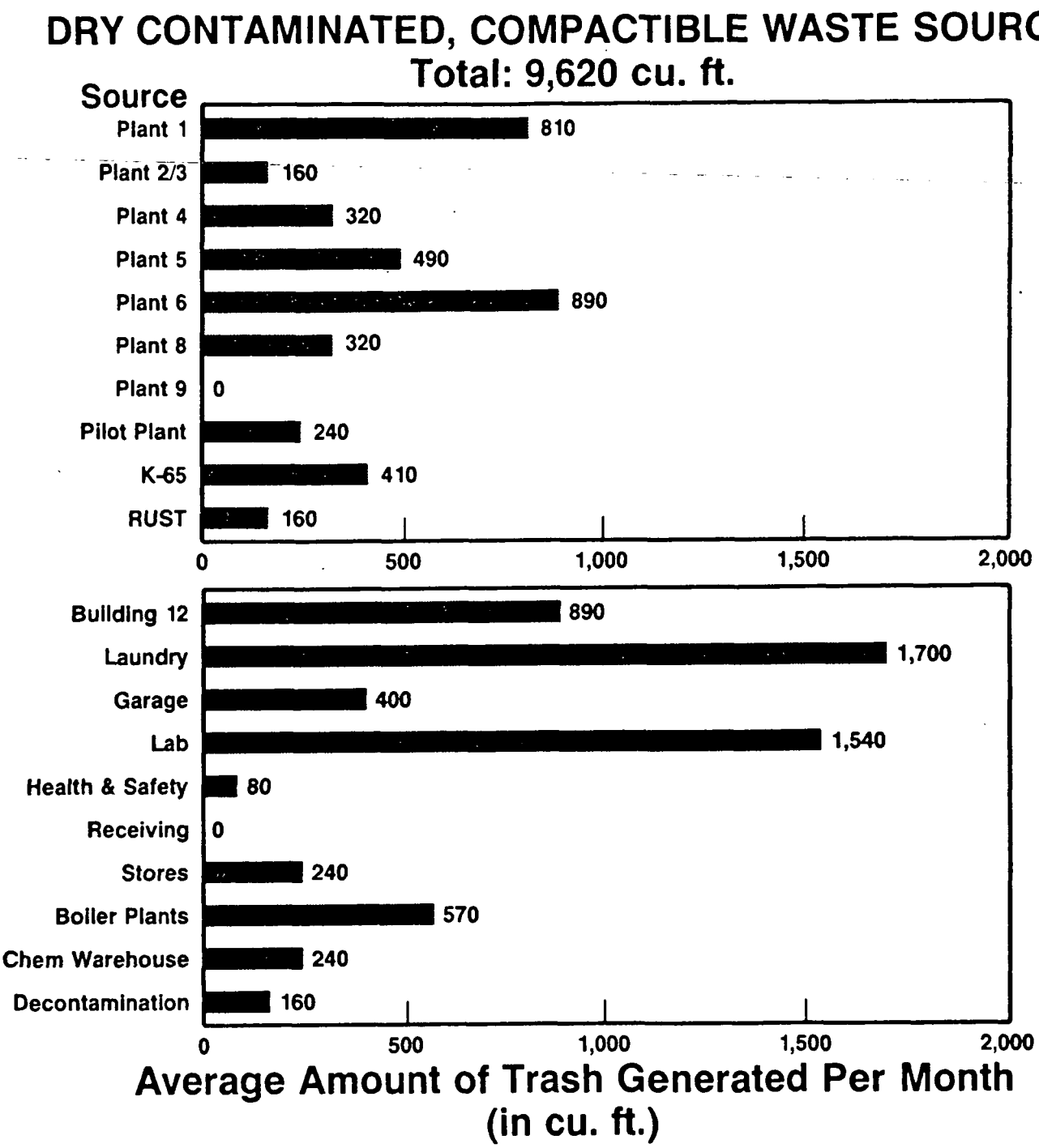


FIGURE 7
Dry, Contaminated, Compactible Waste Sources

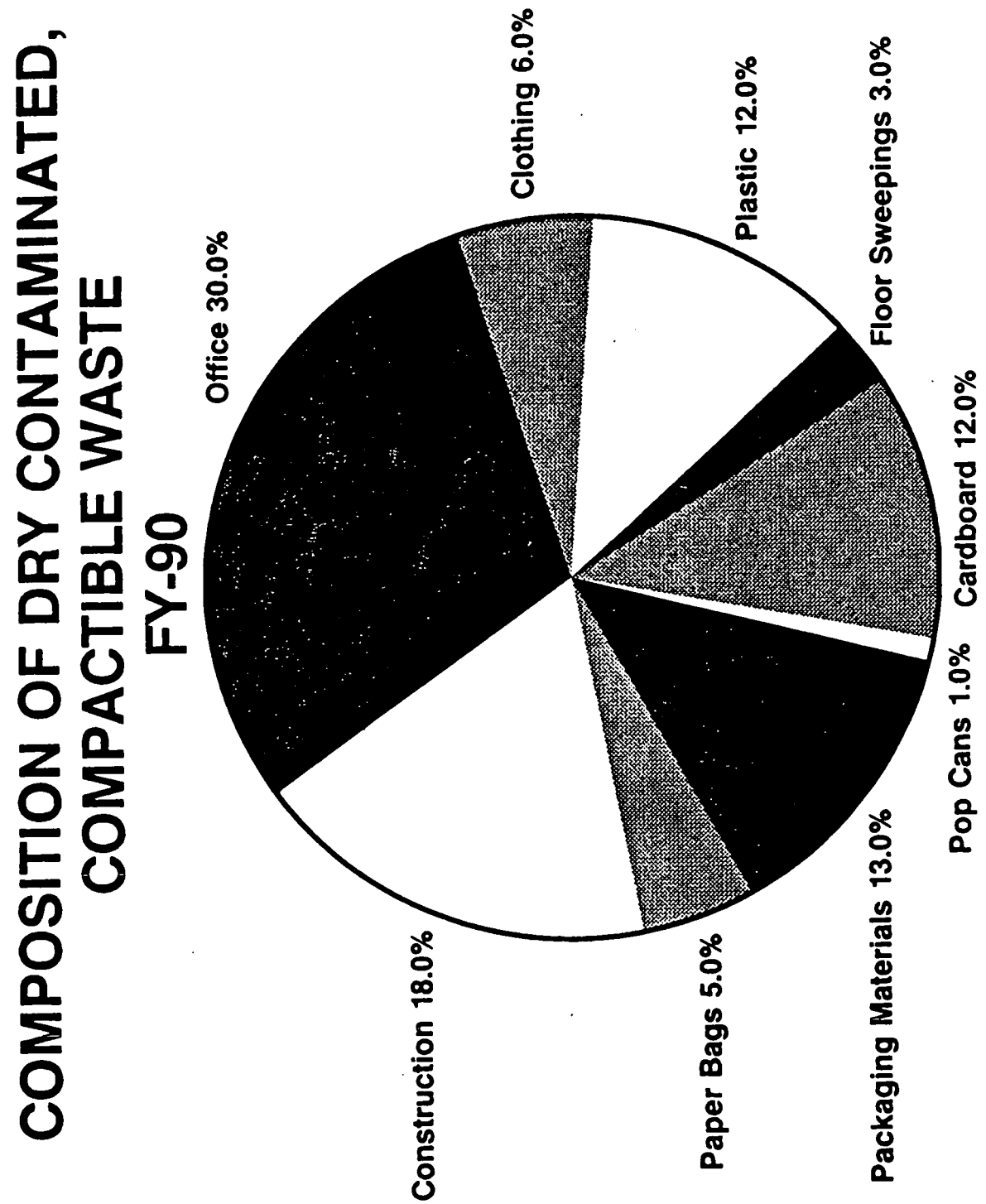
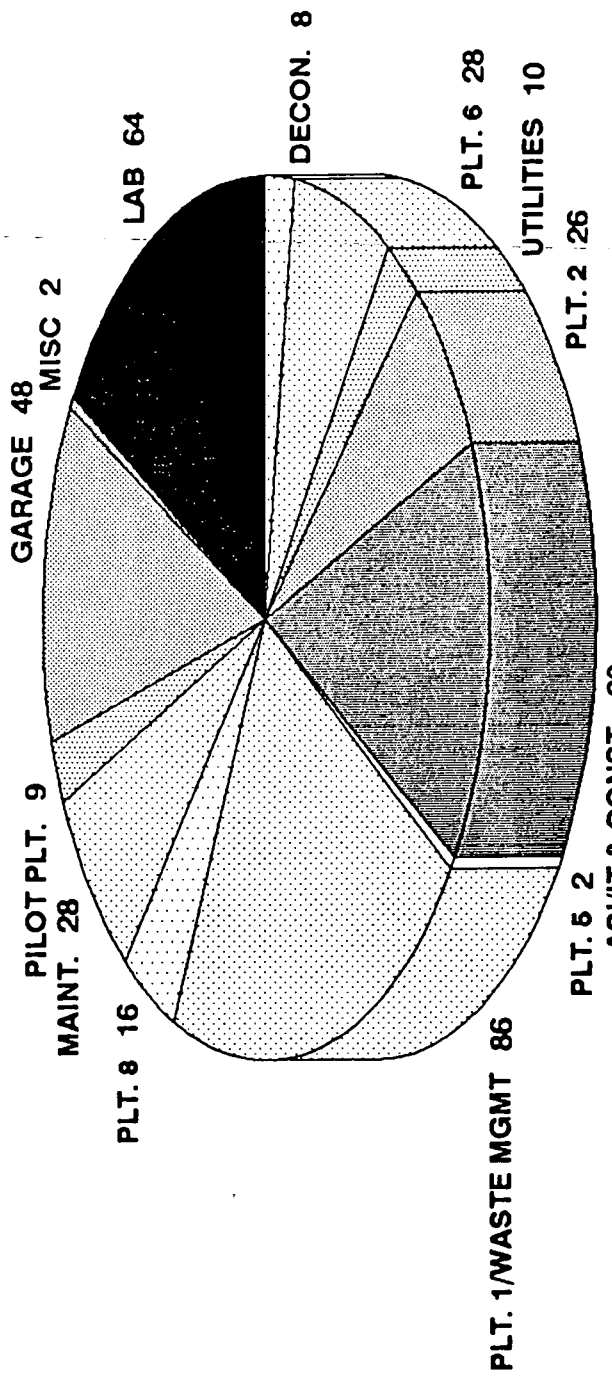


FIGURE 8
Composition of Dry, Contaminated Compactible Waste

RCRA GENERATION 1990

Figure 5



TOTAL = 387 DEs GENERATED

FL:rcragen

FIGURE 9
FY-90 RCRA Generation

6.1.2 Assess Waste Streams

Assessments of all waste-generating operations at the FMPC will be conducted by Waste Assessment Teams organized by the Waste Minimization Team. The assessment teams consists of individuals who can furnish specialized expertise that will be needed to conduct the assessments of specific waste streams identified by the Waste Minimization Team.

The assessment teams are responsible for evaluating and identifying waste minimization opportunities for their particular waste stream. Each team reports the data and findings from the assessment to the Waste Minimization Team and recommends options for waste minimization. The assessment team then monitors and evaluates the progress of an implemented waste minimization action on their specific waste stream and report successes, modifications, or further evaluation.

6.1.3 Prioritize Waste Streams

The Waste Assessment Team has the responsibility of prioritizing waste streams for waste minimization actions. The waste assessments will concentrate on the most important waste problems first, and then move on to the lower priority problems as the time, personnel, and budget permit.

Listed below are some of the considerations for prioritizing waste streams to assess:

- Compliance with current and future regulations.
- Costs of waste management (storage, treatment, disposal).
- Potential environmental and safety liability.
- Quantity of waste.
- Hazardous properties of the waste.
- Safety concern to employees.
- Potential for (or ease of) minimization.

6.1.4 Identify and List Options

The final phase of the assessment is for the team to develop a comprehensive set of waste minimization options. Completion of waste stream flow diagrams, material balances, and baseline information permits the identification of inefficiencies that may be potential waste minimization projects.

The process of identifying options first concentrates on source reduction options, followed by recycling technologies. Identifying options is done as part of a group brainstorming session that encourages creative and independent thinking.

6.1.5 Evaluate and Rank Options

The Waste Minimization Team evaluates the potential technical success and economic cost/benefit of each option identified by the Waste Assessment Team.

6.1.5.1 Technical Evaluation

The technical evaluation must consider facility restraints such as safety, available space, available utilities, vendor services, and any special expertise required. All organizations that might be affected by the change should contribute to the evaluation.

6.1.5.2 Economic Cost/Benefit Evaluation

Economic evaluation of options is performed using various cost elements and savings. The criteria used for selecting options is associated with capital costs or operating costs. An important item of operating cost is the avoidance or reduction of onsite and offsite waste treatment, storage, and disposal costs. Unit costs for handling waste have steadily increased, and reductions in waste volume will yield immediate savings.

For the purpose of this report and the waste minimization goals that have been listed in section 4.4, the following measures were used to evaluate the options identified.

1552

6.1.5.2.1 Low Level Waste

LLW was evaluated by analyzing the cost of offsite disposal. For volume reduction calculations, a figure of $160 per drum equivalent (DE) was used as a disposal cost. A DE has a volume of 7.4 cu. ft. The potential savings are listed in section 4.4. under volume reduction.

6.1.5.2.2 RCRA/Mixed Waste

The FMPC generates approximately 400 DEs of RCRA/mixed waste per year (refer to Figure 9). The waste that is generated is drummed and placed into onsite RCRA warehouses. The cost of maintaining (storing) one DE of RCRA waste is estimated at $400 per DE. Along with the monetary cost of storing RCRA/mixed waste are the legal complications of storing this waste, which include: regulatory liability; cradle-to-grave responsibility; detailed record-keeping; limited disposal options; and surveillance issues.

In evaluating the options for waste minimization for RCRA mixed waste streams, operating cost and storage complications were the important criteria used.

6.2 Waste Minimization Implementation

The Waste Minimization Team identifies the department or organization that is responsible for devising the minimization method and implementing the change in operation. The implementing organization allocates the required funding and manpower to accomplish the action. The executing organization is responsible for achieving the minimization goals set by the Waste Minimization Team and for communicating any problems to the team.

6.3 Waste Tracking System

6.3.1 Tracking From Point of Generation to Point of Disposition

The major responsibility for tracking wastes from their point of generation to the point of disposition will be Materials Control and Accountability (MC&A).

MC&A currently tracks all nuclear materials onsite. They utilize a computerized database system that tracks all nuclear material that is received, stored, moved, packaged, or shipped.

MC&A will be tracking all waste onsite in the future. An all-materials inventory is currently taking place, which will incorporate all waste streams into the database system.

The database system shows the source of the waste, generation date, type of material, volume, net weight, and disposition. This database system will serve as a baseline for tracking waste minimization efforts and will provide data needed for evaluation and performance of waste minimization options. Changes in waste generation cannot be meaningfully measured unless the information is collected both before and after a waste minimization option is implemented.

6.3.2 Program Activity Tracking

The Waste Minimization Team is responsible for tracking the progress of waste minimization actions. Each member of the team is assigned a waste minimization option that is implemented, and will be responsible for tracking the progress of the action. Monthly team meetings may be held to evaluate the options and review data collected by the team member.

S&E1

1552

FMPC
WASTE ASSESSMENT FLOW DIAGRAM

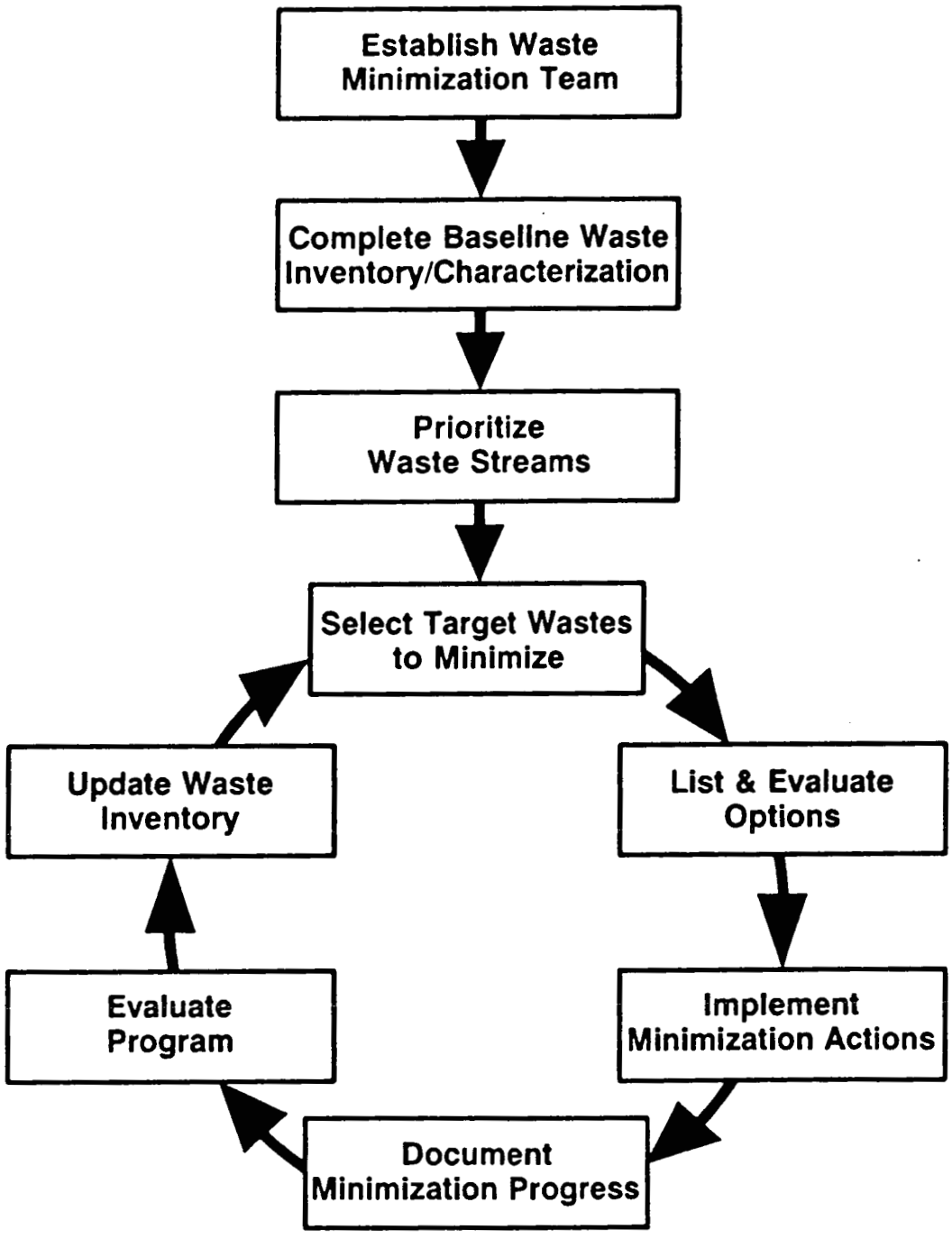


FIGURE 10
Waste Assessment Flow Diagram

41

91

6.4 Technology Transfer

Lessons learned about waste minimization technologies that have been implemented are collected by the Waste Minimization Team and disseminated to all departments at the FMPC and/or other DOE facilities. Success stories will be publicized by newsletters, bulletin boards, and pictorial essays. Publicizing success stories will trigger additional ideas and will benefit DOE if the public and local residents perceive the FMPC to be handling waste responsibly.

The waste minimization class presented at the DOE/Westinghouse School for Environmental Excellence will share FMPC site-specific accomplishments and goals to other DOE facilities.

Workshops and seminars will be utilized, as well as field trips to other DOE facilities to learn of waste minimization technology and techniques. This information will be shared with appropriate personnel by the Waste Minimization Team.

6.5 Program Evaluation

The Waste Minimization and Pollution Prevention Awareness Program will be continually evaluated and annual reviews will be documented. All major activities will be reviewed. The evaluation will document program achievements and identify potential areas for improvement. Achievements and milestones of the program will be a part of the contractor's performance evaluation and determination of award fees.

The following success criteria will be used to demonstrate the effectiveness of waste minimization efforts:

- Reduced generation rates of LLW, mixed waste and sanitary waste.
- Reduced waste management costs.
- Improved regulatory compliance.
- Reduced health risks.
- Increased process efficiency.
- Reduced accident risk.
- Improved public relations.

The Waste Minimization Team will address these criteria when evaluating the success of implemented actions to achieve waste volume or toxicity reductions.

A report will be made to the Site Manager and will contain current-year data, performance trends, forecasts, and measures used to gauge the performance of waste minimization activities. The evaluation report will be used to establish future waste minimization goals and program objectives. The report will also be used to determine changes to this plan.

7.0 TRAINING, AWARENESS, AND INCENTIVES

7.1 Employee Training Goals

One of the most important elements of the Waste Minimization and Pollution Prevention Awareness Program is training. Training activities will be integrated with an existing training program. The goal is to make each employee aware of waste generation, its impact on the site and the environment, and ways waste can be reduced and pollution prevented. The training program is to include waste minimization concepts that should be incorporated into every job aspect, so that it is routinely integrated into each phase of an operating procedure or design consideration.

A class has been developed on waste minimization techniques and presented at the DOE/Westinghouse School for Environmental Excellence.

7.2 Employee Awareness Goals

Initial FMPC employee awareness of the Waste Minimization and Pollution Prevention Awareness Program results from the WMCO management directive and policy statement. The primary responsibility for informing FMPC personnel on an ongoing basis of waste minimization activities, achievements, and concepts will be the Waste Minimization Team.

The Waste Minimization Team informs FMPC personnel of current and ongoing waste minimization accomplishments by use of pictorial essays, graphs that track progress, site bulletin boards, and site communication media (i.e., Focus, The Communicator, FMPC Update). This will be done on a monthly basis.

The Waste Minimization Team will also establish a waste minimization/pollution prevention slogan contest to heighten awareness of these issues. This will be done bi-monthly.

7.3 Employee Incentives, Awards, and Recognition

Incentives such as awards, plaques, and other forms of recognition shall be utilized to provide motivation, and to boost employee cooperation and participation. Meeting waste minimization goals will be a measure for evaluating the job performance of managers and employees through the performance management system and applicable performance objectives.

Waste minimization suggestion boxes will be used to elicit participation from employees, and awards will be given to employees whose waste minimization suggestions and/or ideas are efficient and cost effective.

Waste minimization information and graphs that track progress will be published or posted on a routine basis by the Waste Minimization Team.

8.0 REFERENCES

8.1 DOE Order 5820.2A, "Radioactive Waste Management"

8.2 DOE Order 5400.1, "General Environmental Protection Program"

8.3 DOE Order 5400.3, "Hazardous and Radioactive Mixed Waste Program"

8.4 EPA, "Code of Federal Regulations," Title 40, Subchapter J, "Superfund, Emergency Planning, and Community Right-to-Know Programs"

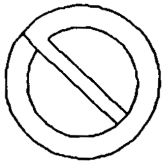
8.5 FMPC Roadmap, Volume 1 and 2; Predecisional Draft, January 31, 1991

8.6 FMPC Baseline Inventory Report, December 28, 1990

8.7 FMPC Waste Generation Prediction Report, February 20, 1991

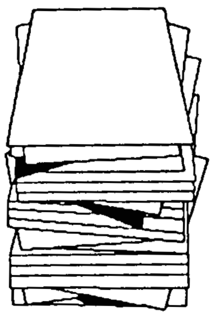
Figure 11

FMPC WASTE MINIMIZATION ACCOMPLISHMENTS



Source Elimination

* Eliminated lead-based paint usage
* Initiated chemical product inventory reduction program
* Eliminated 1,1,1-trichloroethane use onsite, except paint shop



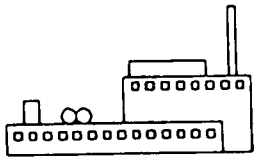
Recycle/Reuse

* Formed FMPC Total Quality Recycling Team
* Implemented paper and aluminum recycling program
* Began reuse of Xylene in laboratory

FIGURE 11
Waste Minimization Accomplishments Bullet List

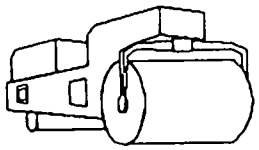
1552

Figure 11 (Continued)
FMPC WASTE MINIMIZATION ACCOMPLISHMENTS



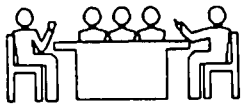
Segregation/Decontamination

* Segregated 13,500 cu. yds. of rubble/soil and office waste in 1990
* Decontaminated 485 tons of scrap steel



Volume Reduction

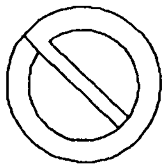
* Compacted 4,850 cu. yds. noncontaminated trash to 1,070 cu. yds.
* Compacted 2,300 cu. yds. contaminated dry, compactible trash to 770 cu. yds.
* Compacted 65,000 cu. ft. compactible refuse metal/scrap drums to 22,000 cu. ft.



Organizational

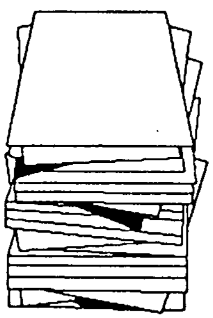
* Conducted Baseline Waste Inventory
* Predicted Waste Generation for FY-91, 92, 93, 94
* Formed Waste Minimization Team

Figure 12
FMPC WASTE MINIMIZATION GOALS



Source Elimination

* Conduct sampling and analysis on benzene contaminated oils from garage to classify as LLW
* Review and eliminate all infrequently used or duplicated chemicals onsite
* Substitute cloth "anti-Cs" for all paper "anti-Cs"



Recycle/Reuse

* Maintain office paper, computer paper, and aluminum can recycling efforts
* Initiate LasetJet cartridge recycling campaign
* Begin operation of distillation unit for spent solvent recovery in paint shop
* Initiate recycling of trichlorotrifluoroethane (Freon) in the lab
* Start operation of new Drum Reconditioning Facility

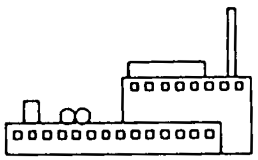
1552

48

Figure 12 (Continued)

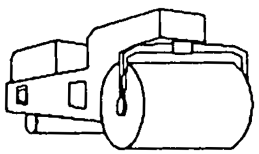
FMPC WASTE MINIMIZATION GOALS

Segregation/Decontamination



* Update laundry system to facilitate segregation
* Initiate PTA for process area compactible waste segregation
* Decontaminate 5,000 DEs (575 tons) of scrap metal per year

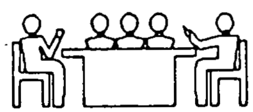
Volume Reduction



* Implement super compaction system in Plant 8
* Begin operation of the Plant 8 Rotex repackaging station
* Start operaation of the Plant 8 rotary kiln
* Evaluate feasibility of Trash and Scrap Monitoring Facility
* Initiate PTA for solids precipitation in Plant 8

Figure 12 (Continued)

FMPC WASTE MINIMIZATION GOALS



Organizational

* Integrate waste minimization/pollution prevention awareness into training courses
* Implement employee slogan contests
* Renew employee suggestion boxes and incentive programs
* Inform employees of accomplishments by use of bulletins, pictorial essays, and site media
* Perform ongoing waste assessments

1552

50